Assignment 1 part 1 Log file

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Log file

1. theta = np.ones(X_train.shape[1]), Test size = 0.2, Learning rate = 0.01, Iterations = 50000, Random State = 41

Figure 1: vectorization

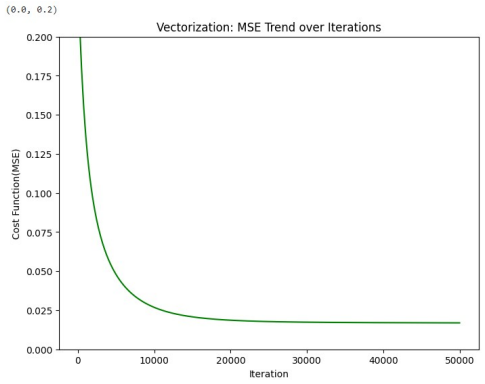

Figure 2: predicted vs Observed

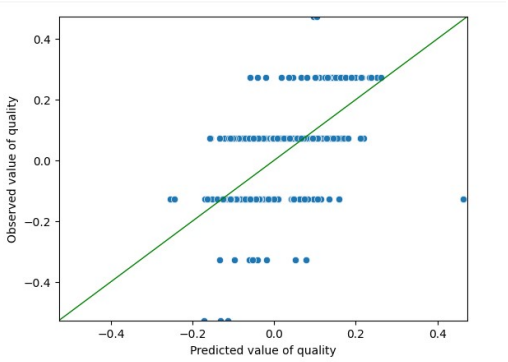

Figure 3: Performance values

	train	test
Mean Absolute Error	0.100589	0.100779
Mean Square Error	0.016924	0.017144
R2 Score	0.356838	0.314909

```
------ Training Performance ------
- Mean Squared Error = 0.10058877584501794
- Mean Absolute Error = 0.016923500591292946
- R2 Score = 0.35683814151429716

------ Testing Performance ------
- Mean Squared Error = 0.10077853744859062
- Mean Absolute Error = 0.01714441157547687
- R2 Score = 0.3149086283525726
```

2. theta = np.ones(X_train.shape[1]), Test size = 0.2, Learning rate = 0.01, Iterations = 100000, Random State = 41

Figure 4: vectorization

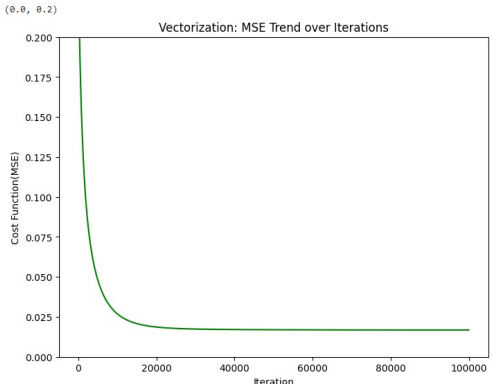

Figure 5: predicted vs Observed

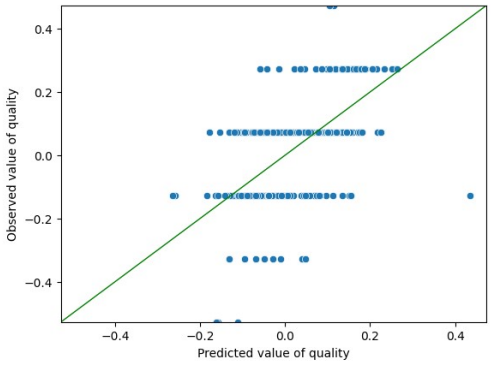

Figure 6: Performance values

	train	test
Mean Absolute Error	0.100126	0.099739
Mean Square Error	0.016753	0.016888
R2 Score	0.363299	0.325166

```
 ------ Training Performance ------
- Mean Squared Error = 0.10012573300736038
- Mean Absolute Error = 0.016753489168897646
- R2 Score = 0.36329926708354343

 ------ Testing Performance ------
- Mean Squared Error = 0.09973884234148914
- Mean Absolute Error = 0.01688773314290441
- R2 Score = 0.32516550877504846
```

3. theta = np.ones(X_train.shape[1]), Test size = 0.1, Learning rate = 0.01, Iterations = 100000, Random State = 41

Figure 7: vectorization

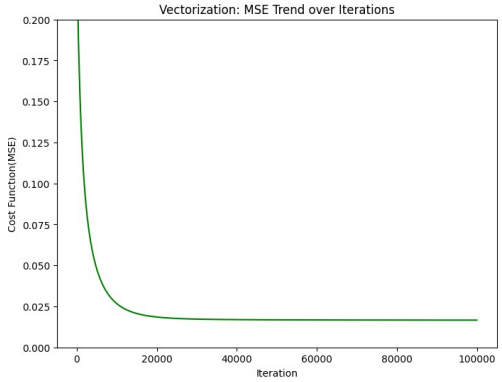

Figure 8: predicted vs Observed

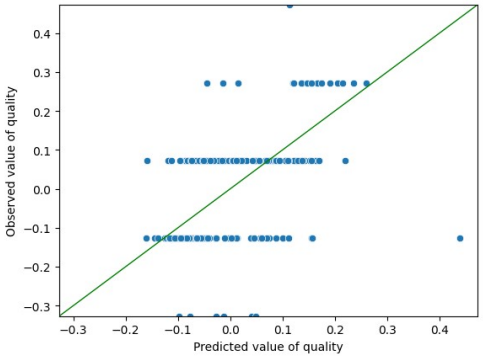

Figure 9: Performance values

	train	test
Mean Absolute Error	0.099852	0.102812
Mean Square Error	0.016622	0.018384
R2 Score	0.373542	0.159042

```
------ Training Performance ------
- Mean Squared Error = 0.09985155426913782
- Mean Absolute Error = 0.016621914248668178
- R2 Score = 0.37354217668345224

------ Testing Performance ------
- Mean Squared Error = 0.10281237689698827
- Mean Absolute Error = 0.018384129023271134
- R2 Score = 0.15904205740164923
```

4. theta = (np.ones(X_train.shape[1]))*X_test.mean(), Test size = 0.2, Learning rate = 0.01, Iterations = 100000, Random State = 41

Figure 10: vectorization

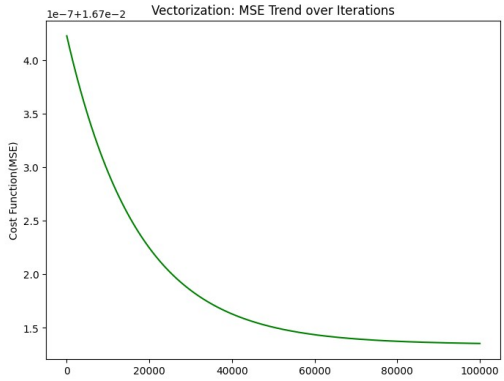

Figure 11: predicted vs Observed

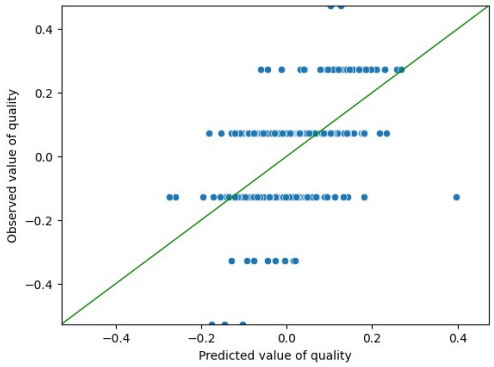

Figure 12: Performance values

	train	test
Mean Absolute Error	0.100153	0.099045
Mean Square Error	0.016700	0.016651
R2 Score	0.365316	0.334623

```
------ Training Performance ------
- Mean Squared Error = 0.10015282578820428
- Mean Absolute Error = 0.01670042279100442
- R2 Score = 0.3653160052899681

------ Testing Performance ------
- Mean Squared Error = 0.09904466687100469
- Mean Absolute Error = 0.016651071705172778
- R2 Score = 0.334622509283805
```

5. theta = (np.ones(X_train.shape[1]))*X_test.mean(), Test size = 0.1, Learning rate = 0.1, Iterations = 5000, Random State = 40

Figure 13: vectorization

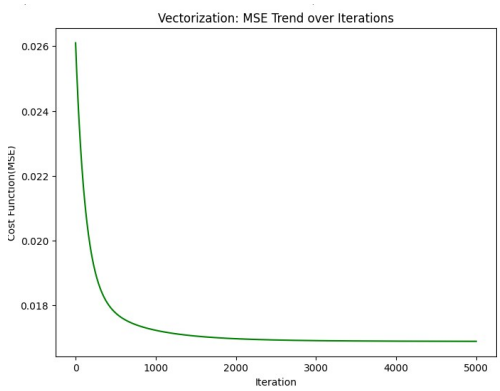

Figure 14: predicted vs Observed

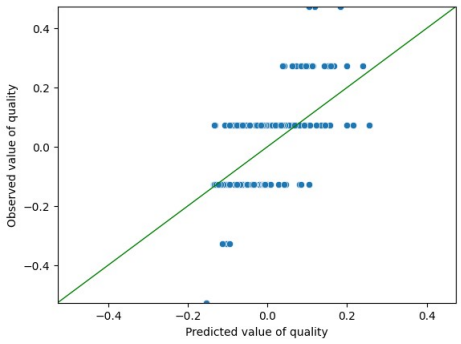

Figure 15: Performance values

	train	test
Mean Absolute Error	0.100702	0.097373
Mean Square Error	0.016897	0.014858
R2 Score	0.350466	0.437206

```
------ Training Performance ------
- Mean Squared Error = 0.10070175310531591
- Mean Absolute Error = 0.01689667984447928
- R2 Score = 0.350466153841699

------ Testing Performance ------
- Mean Squared Error = 0.09737312956054002
- Mean Absolute Error = 0.014857754435721585
- R2 Score = 0.43720627137418244
```

6. theta = (np.ones(X_train.shape[1]))*X_test.mean(), Test size = 0.1, Learning rate = 0.01, Iterations = 50000, Random State = 40

Figure 16: vectorization

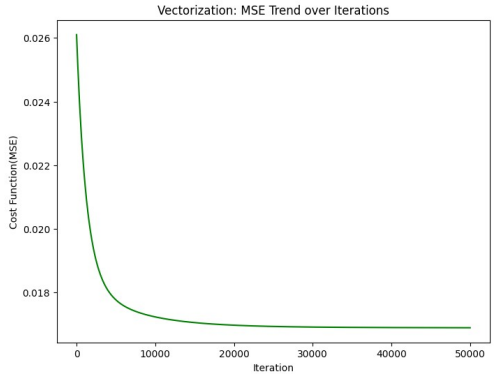

Figure 17: predicted vs Observed

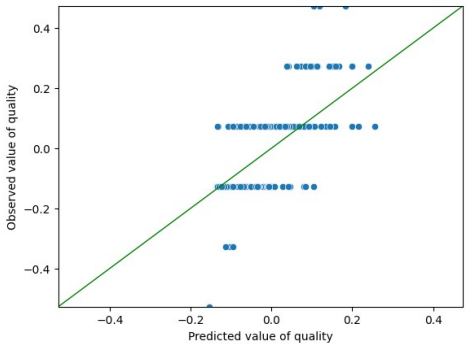

Figure 18: Performance values

	train	test
Mean Absolute Error	0.100702	0.097373
Mean Square Error	0.016897	0.014858
R2 Score	0.350466	0.437205

```
------ Training Performance ------
- Mean Squared Error = 0.10070178768143345
- Mean Absolute Error = 0.016896682926965764
- R2 Score = 0.3504660353462713

------ Testing Performance ------
- Mean Squared Error = 0.09737325181333918
- Mean Absolute Error = 0.014857791629164407
- R2 Score = 0.43720486253165125
```

7. ****BEST CASE****
   theta = (np.ones(X_train.shape[1]))*X_test.mean(), Test size = 0.1, Learning rate = 0.01, Iterations = 100000, Random State = 40

Figure 19: vectorization

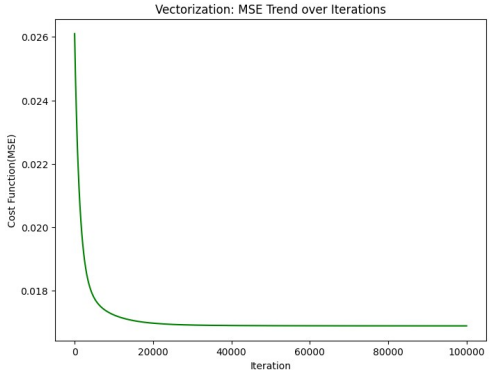

Figure 20: predicted vs Observed

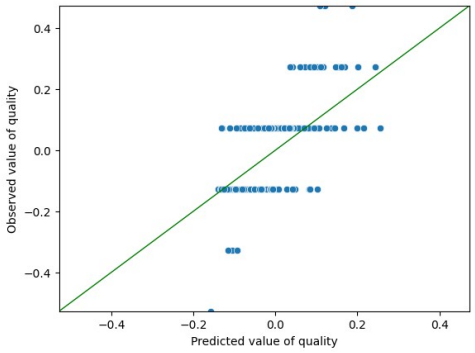

Figure 21: Performance values

	train	test
Mean Absolute Error	0.100630	0.097254
Mean Square Error	0.016891	0.014800
R2 Score	0.350673	0.439401

```
------ Training Performance ------
- Mean Squared Error = 0.10062957707393065
- Mean Absolute Error = 0.016891287908883598
- R2 Score = 0.3506734279747201

------ Testing Performance ------
- Mean Squared Error = 0.09725383316632889
- Mean Absolute Error = 0.01479981326231688
- R2 Score = 0.4394010127910273
```